

## CLAIMS

What is claimed is:

1. A distributed printing system comprising:
  - a print instruction device that issues a distributed print request based on print data;
  - a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion; and
  - a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:
    - said distributed print management server identifies one of said print jobs to be printed, provides a distributed print start notification to said printers, selects from among printers that have issued an acquisition request for said identified print job a printer that is appropriate for said identified job on the basis of printing capabilities and status information of the printer, and assigns said identified print job to said selected printer.
2. A distributed printing system comprising:
  - a print instruction device that issues a distributed print request based on print data;
  - a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion; and
  - a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:
    - said printers receive a print start notification from said distributed print management server and, if said printers are available for printing, provide a

print job acquisition request for said print job to said distributed print management server along with the printing capability information and status information of said printers; and

said distributed print management server identifies one of said print jobs to be printed from said print job holding portion, provides said print start notification to all or some of said plurality of printers, selects from among printers that have issued said print job acquisition request a printer that is appropriate for said print job on the basis of the printing capabilities and status information of the printers, and assigns said print job to said printer.

3. A distributed printing system comprising:

a print instruction device that issues a distributed print request based on print data;

a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion; and

a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:

said printers receive a print start notification from said distributed print management server and, if said printers are available for printing, provide a print job acquisition request for said print job to said distributed print management server along with the printing capability information and status information of said printers; and

each time said distributed print management server obtains one or more print jobs from said print job holding portion, said distributed print management server provides said distributed print start notification to all or some of said plurality of printers, selects one or more printers that complete

the print job in the shortest time from warm-up from among printers that have issued said print job acquisition request, on the basis of printing capabilities and the status information of the printer, and assigns the print jobs to the printers.

4. A distributed printing system comprising:

a print instruction device that issues a distributed print request based on print data;

a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion; and

a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:

said printers receive a print start notification from said distributed print management server and, if said printers are available for printing, provide a print job acquisition request for said print job to said distributed print management server along with the printing capability information and status information of said printers; and

each time said distributed print management server obtains a print job from said print job holding portion, said distributed print management server provides said distributed print start notification to all or some of said plurality of printers, selects a printer that completes the print job in the shortest time from print data reception from among printers that have issued said print job acquisition request, on the basis of printing capabilities and the status information of the printer, and assigns the print job to the printer.

5. A distributed printing system comprising:

a print instruction device that issues a distributed print request based on print data;

a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion; and

a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:

each of said printer sends a print job acquisition request for said print job to said distributed print management server along with printing capability information and status information of said printer if said printer is available for printing; and

each time said distributed print management server obtains a print job from said print job holding portion, said distributed print management server selects printers that are available for printing from among printers that have issued said print job acquisition request, selects a printer that is appropriate for said print job from among said selected printers on the basis of printing capabilities and the status information of the printer, and assigns said print job to said printer.

6. The distributed printing system according to claim 1, wherein:

if there is no printer that is appropriate for said identified print job in said selection of an appropriate printer, said distributed print management server makes said print job wait temporarily, identifies the next print job that is different from said print job, and provides a distributed print start notification for said next print job to all of said plurality of printers.

7. The distributed printing system according to claim 1, wherein, said print job holding portion is a print queue holding said print jobs in the order in which said print jobs are received.

8. The distributed printing system according to claim 1, wherein said print instructing device comprises:

- an input-output interface that communicably connects to said distributed print management server;

- a print data generating unit that generates print data from data to be printed and print settings that indicate printing mode of said data to be printed;

- a print request issuing unit that sends a print request to said distributed print management server through said input-output interface; and

- a print status display unit that receives a notification from said distributed print management server and displays a print status.

9. The distributed printing system according to claim 1, wherein said distributed print management server comprises:

- an input-output interface that communicably connects to said print instructing device and each of said printers;

- a print request receiving unit that receives a print request containing print data and print settings from said print instructing device;

- a print data dividing unit that divides the received print data into a plurality of print jobs for distributed printing;

- a print job holding portion managing unit that holds and manages the print jobs generated by dividing the print data and the correspondences of the status between the print jobs and the print data; and

a distributed printing control unit that controls distributed printing interaction between the print job holding portion management unit and the printers.

10. The distributed printing system according to claim 9, wherein said distributed printing control unit comprises:

a print starting module that issues a print start notification to said plurality of printers and receives and stores printing capability information of printers that has issued a print job acquisition request;

a print job acquisition request receiving module that receives the print job acquisition request from said printers along with the status information of the printers and selects an optimal printer on the basis of the status information and the printing capability information to send print data; and

a print result receiving module that receives the result of print job execution from said printer.

11. A distributed printing system comprising:

a print instructing device that generates print data and issues a distributed print request;

a distributed print management server that divides the print data into a plurality of print jobs according to the distributed print request and stores the print jobs in a print queue; and

a plurality of printers that acquire a print job from the distributed print management server and performs printing, wherein:

each time said distributed print management server obtains a print job from said print queue, said distributed print management server provides distributed print start notification to all of said printers, selects printers

available for printing from among printers that have issued a print job acquisition request, selects a printer that is appropriate for said print job from among the selected printers on the basis of printing capabilities and the status information of the printers, and assigns said print job to said printer.

12. A distributed printing system comprising:

- a print instructing device that generates print data and issues a distributed print request;

- a distributed print management server that divides the print data into a plurality of print jobs according to the distributed print request and stores the print jobs in a print queue; and

- a plurality of printers that acquire a print job from the distributed print management server and performs printing, wherein:

- each time said distributed print management server obtains a print job from said print queue, said distributed print management server provides distributed print start notification to all of said printers, selects printers available for printing from among printers that have issued a print job acquisition request, selects a printer that completes the print job in the shortest time from warm-up from among the selected printers, on the basis of printing capabilities and the status information of the printer, and assigns the print job to the printer.

13. The distributed printing system according to claim 11 wherein, if there is no printer that is appropriate for a obtained print job, the print job is made wait temporarily, the next print job is obtained from the print queue, the distributed print start notification is provided to all of said printers once again, printers that are available for printing are selected from among printers that

have issued a print job acquisition, a printer that is appropriate for the print job is selected from the selected printers on the basis of printing capabilities and the status information of the printers, and the print job is assigned to the printer.

14. The distributed printing system according to claim 11,  
wherein said print instructing device comprises:
  - an input-output interface that communicably connects to said distributed print management server;
  - a print data generating unit that generates print data from data to be printed and print settings that indicate printing mode of the data;
  - a print request issuing unit that sends a print request to said distributed print management server through said input-output interface; and
  - a print status display unit that receives a notification from said distributed print management server and presents a print status to a user.
15. The distributed printing system according to claim 11, wherein said distributed print management server comprises:
  - an input-output interface that communicably connects to said print instructing device and each of said plurality of printers;
  - a print request receiving unit that receives a print request containing print data and print settings from said print instructing device;
  - a print data dividing unit that divides the received print data into a plurality of print jobs for distributed printing;
  - a print queue managing unit that holds and manages the print jobs generated by dividing the print data and the correspondences of the status between the print jobs and the print data; and



a distributed printing control unit that controls distributed printing interaction between the print queue management unit and the printers.

16. The distributed printing system according to claim 15, wherein said distributed printing control unit comprises:

a print starting processing unit that issues a print start notification to said plurality of printers and receives and stores printing capability information of printers that has issued a print job acquisition request;

a print job acquisition request receiving unit that receives the print job acquisition request from said printers along with the status information of the printers and selects an optimal printer on the basis of the status information and the printing capability information to send print data; and

a print result receiving unit that receives the result of print job execution from said printer.

17. Distributed printing system according to claim 11, wherein said printers comprising:

a print control unit that provides a print job acquisition request to said distributed print management server along with the printing capability information and status information of said printers if said printers are idle when said printers receive a print start notification from said distributed print management server, and controls general aspects of printing;

an image processing unit that processes print data received from said distributed print management server to generate printable data;

a printing unit that prints the printable data generated by said image processing unit; and

an input-output interface that communicably connects said print control unit, said image processing unit, and said printing unit with said distributed print management server.

18. A distributed printing method that divides print data into a plurality of print jobs and assigns one of a plurality of printers to each of said plurality of print jobs for performing distributed printing, said method comprising:

when each print job is identified, providing a distributed print start notification to all or some of said printers;

selecting a printer that is appropriate for said each print job from among printers that have issued a print job acquisition request, on the basis of printing capabilities and the status information of the printers; and

assigning said each print job to said selected printer.

19. A distributed printing method that divides print data into a plurality of print jobs and assigns one of a plurality of printers to each of said plurality of print jobs for performing distributed printing, said method comprising:

when each print job is identified, providing a distributed print start notification to all or some of the printers;

selecting a printer that completes the print job in the shortest time from warm-up from among printers that have issued a print job acquisition request, on the basis of printing capabilities and the status information of the printers; and

assigning said print job to said selected printer.

20. A distributed printing method that divides print data into a plurality of print jobs and assigns one of a plurality of printers to each of said plurality of print jobs for performing distributed printing, said method comprising:

when each print job is identified, providing a distributed print start notification to all or some of the printers;

selecting a printer that completes the print job in the shortest time from print data reception from among printers that have issued a print job acquisition request, on the basis of printing capabilities and the status information of the printers; and

assigning said print job to said selected printer.

21. A distributed printing method that divides print data into a plurality of print jobs and assigns one of a plurality of printers to each of said plurality of print jobs for performing distributed printing, said method comprising:

when each print job is identified, selecting printers that are available for printing from among printers that have issued a print job acquisition request; and

selecting a printer that is appropriate for said print job from among said selected printers on the basis of printing capabilities and the status information of the printers; and

assigning said print job to said printer.

22. The distributed printing method according to claim 18, wherein, if there is no printer that is appropriate for said identified print job, said print job is made wait temporarily, the next print job that is different from said print job is obtained, and a distributed print start notification is provided to all or some of said printers.

23. A distributed printing method that divides print data into a plurality of print jobs and assigns one of a plurality of printers to each of said plurality of print jobs for performing distributed printing, said method comprising:

each time a print job is obtained, a distributed print start notification is provided to all of said printers;

selecting printers available for printing from among printers that have issued a print job acquisition request;

selecting a printer that is appropriate for the print job from among the selected printers, on the basis of printing capabilities and the status information of the selected printers; and

assigning the print job to the printer.

24. A distributed printing method that divides print data into a plurality of print jobs and assigns one of a plurality of printers to each of said plurality of print jobs for performing distributed printing, said method comprising:

each time a print job is obtained, a distributed print start notification is provided to all of said printers;

selecting printers available for printing from among printers that have issued a print job acquisition request;

selecting a printer that completes the print job in the shortest time from warm-up from among the selected printers, on the basis of printing capabilities and the status information of the selected printers; and

assigning the print job to the printer.

25. The distributed printing method according to claim 23 wherein, if there is no printer that is appropriate for a obtained print job, the print job is made

wait temporarily, the next print job is obtained from the print queue, the distributed print start notification is provided to all of said printers once again, printers that are available for printing are selected from among printers that have issued a print job acquisition, a printer that is appropriate for the print job is selected from the selected printers on the basis of printing capabilities and the status information of the printers, and the print job is assigned to the printer.

26. A distributed printing program used in a distributed printing system comprising:

- a print instruction device that issues a distributed print request based on print data;

- a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion, and

- a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:

- said program causes a computer of each of said printers to receive a print start notification from said distributed print management server and, if said printer is available for printing, provide a print job acquisition request to said distributed print management server along with the printing capability information and status information of said printer; and

- said program causes a computer of said distributed print management server to:

- identify said print job to be printed from said print job holding portion;

provide distributed print start notification to all or some of said plurality of printers;

select from among printers that have issued a print job acquisition request a printer that is appropriate for said print job on the basis of printing capabilities and the status information of the printer; and

assign said print job to said printer.

27. A distributed printing program used in a distributed printing system comprising:

a print instruction device that issues a distributed print request based on print data;

a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion; and

a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:

said program causes a computer of each of said printers to receive a print start notification from said distributed print management server and, if said printer is available for printing, provide a print job acquisition request to said distributed print management server along with the printing capability information and status information of said printer; and

said program causes a computer of said distributed print management server to:

provide distributed print start notification to all or some of said plurality of printers each time said distributed print management server obtains a print job from said print job holding portion;

select from among printers that have issued a print job acquisition request a printer that completes the print job in the shortest time from warm-up, on the basis of printing capabilities and the status information of the printer; and

assign said print job to said printer.

28. A distributed printing program used in a distributed printing system comprising:

a print instruction device that issues a distributed print request based on print data;

a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion; and

a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:

said program causes a computer of each of said printers to receive a print start notification from said distributed print management server and, if said printer is available for printing, provide a print job acquisition request to said distributed print management server along with the printing capability information and status information of said printer; and

said program causes a computer of said distributed print management server to:

provide distributed print start notification to all or some of said plurality of printers each time said distributed print management server obtains a print job from said print job holding portion;

select from among printers that have issued a print job acquisition request a printer that completes the print job in the shortest time from print

job reception, on the basis of printing capabilities and the status information of the printer; and

assign said print job to said printer.

29. A distributed printing program used in a distributed printing system comprising:

a print instruction device that issues a distributed print request based on print data;

a distributed print management server that divides said print data into a plurality of print jobs according to said distributed print request and stores the print jobs in a print job holding portion, and

a plurality of printers that acquire said print jobs from said distributed print management server and performs printing, wherein:

said program causes a computer of each of said printers to provide a print job acquisition request to said distributed print management server along with the printing capability information and status information of said printer if said printer is available for printing; and

said program causes a computer of said distributed print management server to:

select printers that are available for printing from among printers that have issued said print job acquisition request beforehand each time said distributed print management server obtains a print job from said print job holding portion;

select a printer that is appropriate for said print job from among said selected printers on the basis of printing capabilities and the status information of the printers; and

assign said print job to said printer.



30. A distributed printing program for causing a computer to function as comprising:

- a print instructing section that generates print data and issues a distributed print request;

- a distributed print managing section that divides the print data into a plurality of print jobs according to the distributed print request and stores said print jobs in a print queue; and

- a plurality of print controlling sections that obtain a print job from said distributed print managing section and causing printing, wherein:

- said distributed print managing section further includes the function of, when said distributed print managing section receives said distributed print request:

- providing a distributed print start notification to all of said print controlling section;

- selecting a print controlling section that is appropriate for printing the print job from among print controlling section that have issued a print job acquisition request; and

- sending the job to said print controlling section.

31. A distributed printing program for causing a computer to function as comprising:

- a print instructing section that generates print data and issues a distributed print request;

- a distributed print managing section that divides the print data into a plurality of print jobs according to the distributed print request and stores said print jobs in a print queue; and

a plurality of print controlling sections that obtain a print job from said distributed print managing section and causing printing, wherein:

said distributed print managing section further includes the function of, when said distributed print managing section receives said distributed print request:

providing a distributed print start notification to all of said print controlling section;

selecting a print controlling section that completes the print job in the shortest time from warm-up from among print controlling section that have issued a print job acquisition request; and

sending the job to said print controlling section.

32. A printer connected to a distributed print management server dividing print data into plurality of print jobs and storing the print jobs through a network, wherein:

said printer receives a print start notification from said distributed print management server and, if said printer is available for printing, provides a print job acquisition request for said print job to said distributed print management server along with the printing capability information and status information of said printer.

33. A printer management server that is connected to a plurality of printers through a network, divides print data into a plurality of print jobs and stores the print jobs, wherein:

said printer management server:

identifies one of said print jobs to be printed;

provides said distributed print start notification to all or some of said plurality of printers;

selects from among printers that have issued an acquisition request for said print job a printer that is appropriate for said print job on the basis of printing capabilities and status information of the printers; and

assigns said print job to said printer.